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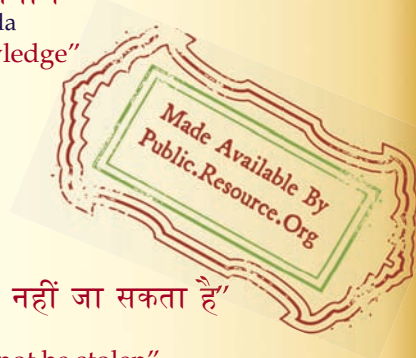
IS 6651 (1972): Anodized aluminium for automobile use [MTD
24: Corrosion Protection]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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IS : 6651 - 1972

Indian Standard "बुनगुहा १६८२"
SPECIFICATION FOR "RE-AFFIRMED 1992"
ANODIZED ALUMINIUM FOR
AUTOMOBILE USE

(Second Reprint AUGUST 1985)

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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Indian Standard

SPECIFICATION FOR ANODIZED ALUMINIUM FOR AUTOMOBILE USE

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Indian Standard

SPECIFICATION FOR ANODIZED ALUMINIUM FOR AUTOMOBILE USE

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 25 October 1972, after the draft finalized by the Metallic Finishes Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 Various thicknesses of anodic coatings have been specified in IS : 1868-1968* for different applications. Three grades of anodic coatings, that is, AC 2.5, AC 5 and AC 10 have been selected for anodized aluminium for automobile use. For the sake of guidance, aluminium and its alloys used in the form of sheet and strip, extrusions and castings for different applications have been suggested in Appendix A. Designations for aluminium and its alloys given in Appendix A have been adopted from IS : 6051-1970†. However, the relevant Indian Standard designations have also been included in brackets for ready reference.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960‡. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard specifies three grades of anodized aluminium for automobile use. This standard, however, does not cover requirements for reflectors.

2. SUPPLY OF MATERIAL

2.1 General requirements relating to supply of material shall conform to IS : 1387-1967§.

*Specification for anodic coatings on aluminium (*first revision*).

†Code for designation of aluminium and its alloys.

‡Rules for rounding off numerical values (*revised*).

§General requirements for the supply of metallurgical materials (*first revision*).

3. FINISH AND APPEARANCE

3.1 The surface finish and appearance of the components and the method by which this is achieved shall be subject to agreement between the purchaser and the supplier. Inspection with regard to finish shall normally be carried out by direct visual comparison with a master sample.

3.2 Samples — At the purchaser's request, the supplier shall submit samples at the time of the original quotation, such samples being fully representative of the material and components to be supplied.

4. GRADES

4.1 Anodized aluminium for automobile use shall be of the following three grades:

<i>Grades</i>	<i>Application</i>
AC 2.5	For interior decorative applications
AC 5	For exterior decorative applications and interior protective applications
AC 10	For exterior applications where maximum protection is required

5. REQUIREMENTS

5.1 Thickness — The minimum thickness of anodic coating in micrometres (μm) for the three grades shall be as given below:

<i>Grades</i>	<i>Thickness (μm)</i>
AC 2.5	2.5
AC 5	5
AC 10	10

5.1.1 Thicknesses of coating shall be determined by the stripping or microsection methods specified in IS : 5523-1969* or with the help of instruments based on eddy current principle (see IS : 6012-1970†).

5.2 Corrosion Resistance — The surface of the anodized articles of Grades AC 5 and AC 10, when subjected to copper-accelerated acetic acid salt spray (CASS) test as prescribed in IS : 5528-1968‡ for 8 hours and

*Methods of testing anodic coatings on aluminium.

†Method for measurement of coating thickness by eddy current.

‡Method of testing corrosion resistance of electroplated and anodized aluminium coatings by copper-accelerated acetic acid salt spray (CASS) test.

12 hours respectively, shall be free from significant signs of corrosion. Articles of Grade AC 2·5, however, when subjected to acetic acid salt test as prescribed in 'Indian Standard method of testing corrosion resistance of electroplated and anodized aluminium coatings by acetic acid salt spray test' for 24 hours shall not show any significant sign of corrosion.

5.3 Abrasion Resistance — The abrasion resistance of the anodic coating shall be tested by the abrasion test given in IS : 5523-1969*. The test requirements, however, shall be mutually agreed upon between the supplier and the purchaser.

5.4 Sealing — The surface of the anodized article shall show no milkiness when tested in accordance with the sulphur dioxide test described in IS : 5523-1969*.

5.5 Brightness — The test requirements, wherever required, shall be agreed to between the supplier and the purchaser.

6. MARKING

6.1 The anodized articles shall be marked with the grade of the coating and the name or trade-mark of the manufacturer. The supplier shall furnish a certificate that the material supplied complies with the requirements of this specification.

6.1.1 The articles may also be marked with the ISI Certification Mark. The supplier's certification (*see* 6.1) shall be complied, if the material is certified under the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

*Methods of testing anodic coatings on aluminium.

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APPENDIX A

(Clause 0.2)

CHEMICAL COMPOSITION OF CAST AND WROUGHT ALUMINIUM AND ALUMINIUM ALLOYS FOR ANODIZING

(Composition limits are in percent maximum unless shown as a range)

DESIGNATION	ALUMINIUM	COPPER	MAGNE- SIUM	SILI- CON	IRON	MANGA- NESE	NICKEL	ZINC	LEAD	TIN	TITA- NIUM PLUS NIO- BIUM	TITA- NIUM AND/OR OTHER GRAIN REFIN- ING ELE- MENTS	CHRO- MIUM	REMARKS	APPLICATIONS
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Cast Aluminium Alloys for Bright Anodizing															
5230 (A-5)	Remainder	0.1	3.0 to 6.0	0.3	0.6	0.3 to 0.7	0.1	0.1	0.05	0.05	0.2	—	—	—	} Automobile fittings and hardware
5500 (A-10)	Remainder	0.1	9.5 to 11.0	0.25	0.35	0.10	0.10	0.10	0.05	0.05	0.2	—	—	—	
Cast Aluminium Alloys for Protective Anodizing															
4250 (A-8)	Remainder	0.1	0.3 to 0.8	3.5 to 6.0	0.6	0.5	0.1	0.1	0.1	0.05	0.2	—	—	—	Cylinder block, crank case, cylinder head, pulley, wheel rim
4225 (A-16)	Remainder	1.0 to 1.5	0.4 to 0.6	4.5 to 5.5	0.6	0.5	0.25	0.1	0.05	0.05	—	—	—	—	Cylinder barrel housing
4223 (A-22)	Remainder	2.8 to 3.8	0.05	4.0 to 6.0	0.7	0.3 to 0.6	0.15	0.15	0.05	0.05	0.2	—	—	—	Transmission cases, fly wheel housings
Wrought Aluminium and its Alloys for Bright Anodizing															
19700	99.7 minimum	0.03	—	0.2	0.25	0.03	—	0.06	—	—	—	—	—	Cu+Si+Fe+Mn+Zn=0.3	Name-plates, mono-grams and other small intricate parts
19500 (IB)	99.5 minimum	0.05	—	0.3	0.4	0.05	—	0.1	—	—	—	—	—	Cu+Si+Fe+Mn+Zn=0.5	Patterned sheet for trim applications
19000 (1C)	99.0 minimum	0.1	—	0.5	0.7	0.1	—	0.1	—	—	—	—	—	Cu+Si+Fe+Mn+Zn=1.0	General application, door sill, etc
51000-A	Remainder	0.2	0.5 to 1.1	0.6	0.7	0.2	—	0.25	—	—	—	—	0.1	—	} Grills, mouldings, window trim, kick pad, kick protector, etc
52000 (N4)	Remainder	0.1	1.7 to 2.8	0.6	0.7	0.5	—	0.2	—	—	—	0.2	0.25	Cr+Mn=0.5	
53000 (N5)	Remainder	0.1	2.8 to 4.0	0.6	0.7	0.5	—	0.2	—	—	—	0.2	0.25	Cr+Mn=0.5	
63400 (H9)	Remainder	0.1	0.4 to 0.9	0.3 to 0.7	0.6	0.3	—	0.2	—	—	—	0.2	0.1	—	Hub, wheel hub, bumper, etc
Wrought Aluminium Alloys for Protective Anodizing															
65400 (H19)	Remainder	0.1	0.4 to 1.5	0.6 to 1.3	0.6	0.2	—	0.1	—	—	—	0.2	0.1	—	Platform and structural of commercial vehicle

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